

Staples (F.)

MINNESOTA STATE MEDICAL SOCIETY.

TREATMENT OF
FRACTURE
OF THE
SHAFT OF THE FEMUR,
THE "AMERICAN METHOD."

A PAPER READ BEFORE THE MINNESOTA STATE
MEDICAL SOCIETY, AT ST. PETER, JUNE 18, 1878.

BY
FRANKLIN STAPLES, M.D.,
OF WINONA.

(RE-PRINTED FROM THE TRANSACTIONS OF THE SOCIETY.)

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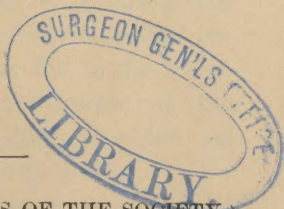
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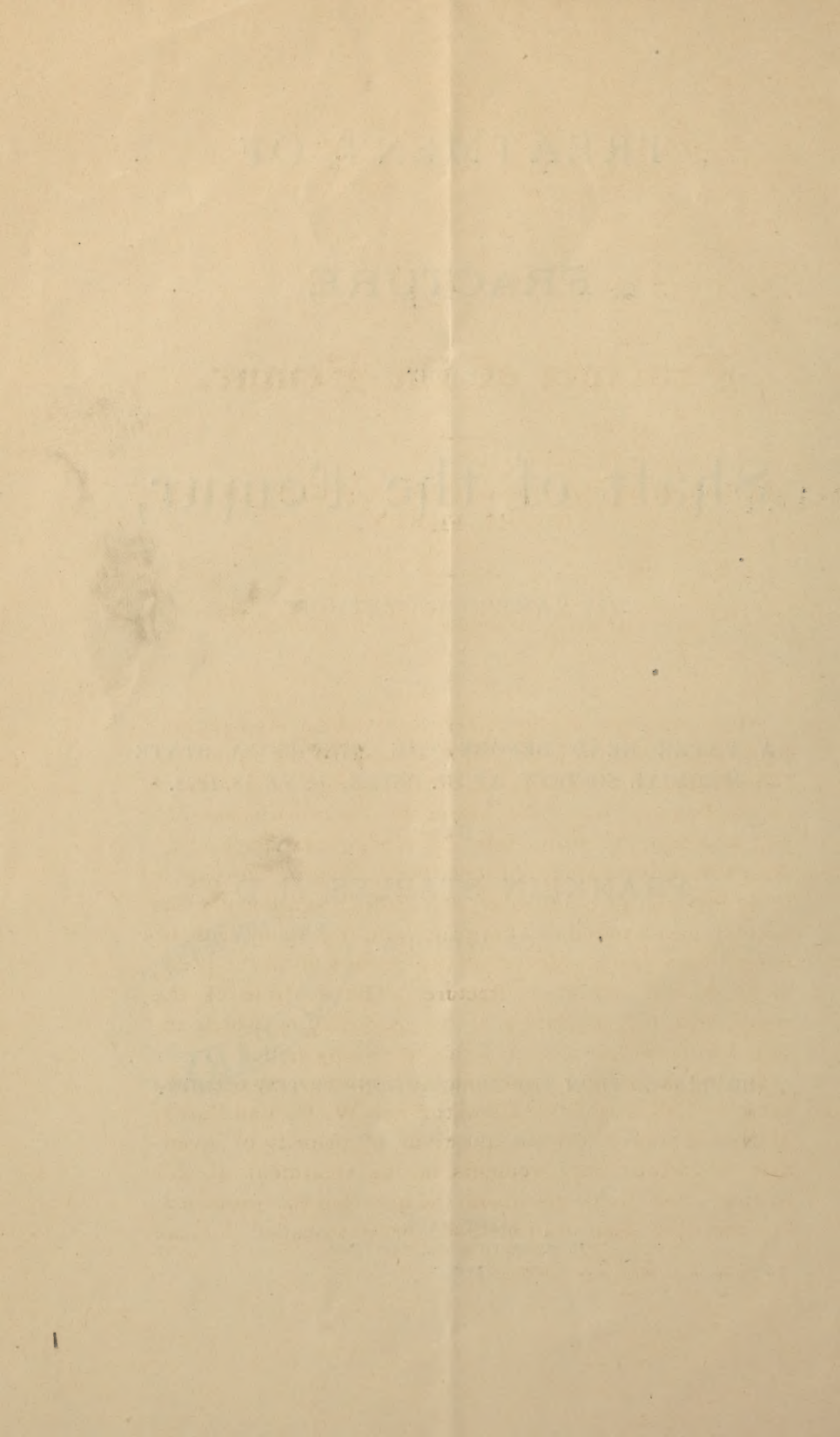
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Fracture of the Femur.

TREATMENT OF FRACTURE OF THE SHAFT OF THE FEMUR.

BY FRANKLIN STAPLES, M. D., WINONA.

At the meeting of the American Medical Association, held in Chicago, in June, 1877, a paper on the subject of "The Value of Extension in the Treatment of Fractures of the Femur," was read before the section on surgery and anatomy, by Prof. John T. Hodgen, of St. Louis.* An earnest discussion followed the reading of the paper, in which a large number of the leading surgeons of the country participated. That paper and discussion had the effect to revive the interest of the profession in the treatment of this important fracture. The doctrine of the essay, and the resolution of the Association which resulted from the discussion, I shall presently notice.

During last winter something of a controversy occurred between Drs. Frank H. Hamilton and W. H. Van Buren, of New York, on certain questions of priority of invention in various improvements in the treatment of this fracture, and in this discussion the question was proposed: "Is there an American method, justly so-called, for the

*Trans. Am. Med. Ass., 1877, p. 511.

treatment of fractures of the femur?"* It is the object of this paper, first, to show that certain recognized inventions and improvements in the treatment of this fracture have been made from time to time, in this country, by American surgeons, that the combination of these improvements constitutes the system or method of treatment now generally adopted, and that to this the term, "American method," may properly be applied; and, second, to illustrate the practical application of this method in the treatment especially of fractures of the *shaft* of the femur. My time is limited, and the account shall be briefly in outline.

"There have been three grand epochs," says Hamilton, "in the history of the treatment of fracture of the thigh†—

"*First*—That in which the straight position was universally adopted, and which reaches from the earliest periods to the period of the writings of Pott, or to about the middle of the last century.

"*Second*—The epoch of the flexed position, which, inaugurated by Pott, had already begun to decline at the beginning of the present century, and which may be said to have been completed within one hundred years from the date of its first announcement.

"*Third*—The epoch of *renaissance*, or that in which surgeons, by vote of an overwhelming majority, have declared in favor of the straight position of the limb. This is the epoch of our own day."

I have this proposition: *That the straight position of the limb, with equable extension in some form of long splint, is essential in securing the best results in the majority of cases of fracture of the femur in adults.*

I will, in the first place, say a few words concerning

*Medical Record, N. Y., Mch. 9, 30, and Apr. 27, 1878.

†Hamilton on Fract. and Dis., 3d Ed., p. 407.

methods based upon views opposed to the doctrine of this statement.

Dr. Nathan Smith, of Baltimore, originated the plan of extension by suspending the limb. Having bandaged it in a semi-flexed position to an anterior splint, he suspended it by a cord from some remote point, allowing the weight of the body, with the obliquity of the suspending cord, to accomplish the required extension.*

Prof. Hodgen, of St. Louis, has modified and improved this treatment, and is its principal able advocate at the present time. Dr. Hodgen has, I think, a wire splint in which he suspends the limb after the manner of Dr. Smith. The paper to the American Medical Association, at the Chicago meeting in 1877, above referred to, was an able defense of this method of treatment. This treatment, according to Dr. Van Buren, was successfully used by Prof. Hodgen during the late civil war, and in 1876, he (Dr. Van Buren) saw it in use in Guy's Hospital, London.† It was also used by Dr. Hewson in the Pennsylvania Hospital.‡

Admitting as correct all that Dr. Hodgen says against the use of simple lateral supports, the plaster of paris dressing, &c., it is, nevertheless, my opinion that the majority of surgeons are not willing, at the present time, to accede to Dr. Hodgen's third proposition in the late article, viz.: "that continuous and equable extension can only be secured by suspending the limb."

The use of the double inclined plane, in the treatment of fractures of the femur, has been so generally abandoned that it need not claim our attention here; but the plaster of paris bandage, even as a first application, has a few advocates. We will let the remarks of Dr. Hodgen, which I will presently quote, answer what may be said in favor of this kind of treatment.

*St. Louis Med. Jour., May 10, 1871.

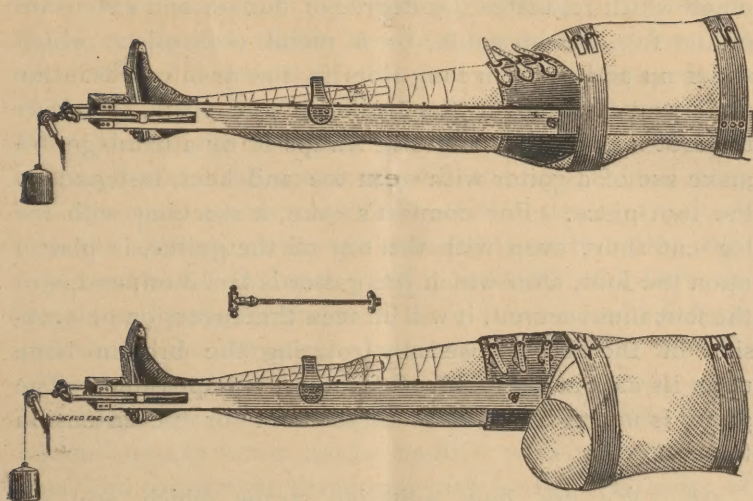
† Medical Record, N. Y., Mch. 30, 1878.

‡ Med. News and Lib., Phil., Feb. 1877, p. 26.

EXTENSION IN THE STRAIGHT POSITION.

If we adopt the general method of treatment authorized and approved by the great majority of surgeons at the present day, viz.: that of extension with the limb in a straight position, which extension is effected by a force acting in the line of the axis of the limb, with lateral supports by some form of long splint or splints, the practical question is, what are the means of securing this extension and support, and how are they best applied in practice? It appears that a system or method of meeting the indications presented in fractured femur within the last quarter of a century has been gradually growing up to its present state of completeness, and that this method is the embodiment of several separate and distinct inventions or improvements made by different American surgeons. It was to such a method of treatment that Dr. Frank H. Hamilton, in his lectures last winter, applied the name of "American method." As affecting the right and appropriateness of the name, it does not matter that in Guy's Hospital in London, at one time, the suspension treatment of Drs. Smith and Hodgen happened to be called the American method by the surgeons in attendance in the hospital, because it was known by them to be an American invention; nor that, in a hospital in Holland, the use of adhesive plaster, with the weight and pulley, was called the American method; nor that, in the service of Nelaton, at the *Hospital des Cliniques*, the adhesive straps, with the long splint and screw extension, was likewise called the "*Appareil Americain*," and all for similar reasons.* If there were any reasons for the name in these cases, there is certainly a greater appropriateness in the term as applied by Prof. Hamilton to that method which includes what is most valuable in them all.

* Dr. Van Buren in Med. Record for Mch. 30, 1878.



The apparatus which I now present to this Society, and which is before you, is designed to embody what is important of the various modern improvements in the treatment of this fracture, and, as I understand it, illustrates what Dr. Hamilton has been pleased to call the "American Method." You will observe the different parts as follows:

1st. The long outside splint. This is cushioned on the inside, where it is possible for a bearing to come upon any part of the body.

2d. The shorter inside splint is here, extending from below the perineum to the same distance below the foot as does the outside splint. This is also cushioned, and supported by being fastened to the outside splint by a metal bottom across the lower ends, and by a metal brace or clasp passing from one to the other above the leg between the knee and the ankle. This brace is movable, and is put on and screwed to the splints after the limb has been put in place.

3d. We have a foot-piece, fixed by an adjustable attach-

ment which regulates the degree of flexion and extension of the foot at the ankle, to a metal cross-piece which slides up and down in long slots in the two splints. As an improvement over the ordinary foot-piece, to which the foot is bound by adhesive straps or by a bandage, we make use of a gaiter with open toe and heel, fastened to the foot-piece. For comfort's sake, a stocking with the leg cut short even with the top of the gaiter, is placed upon the foot, after which the gaiter is laced on, and, with the foot thus secured, it will be seen that inversion or eversion of the foot, caused by rotating the broken bone upon its axis at the point of fracture, is impossible. The gaiter is not to be used as attachment for the extension force.

4th. We use long adhesive straps which are applied to the leg from about two inches above the ankle joint to from four to six inches above the knee, for extension attachment. These are supported by a roller bandage evenly applied to the whole length of the limb. Care should be taken in selecting the adhesive plaster, and, with the varieties and qualities now in the market, there is no excuse for using a poor article.

5th. As the immediate attachment to the lower ends of the adhesive straps, I have, on each side, a piece of rubber tubing. These, in passing down, are not connected to the cross-bar attached to the foot-piece, lest, in stretching under the extension, force should be brought to bear upon the gaiter, which would soon become unendurable; but they are secured to a cross-bar below, by which they are kept so far apart as to avoid pressure upon the malleoli. To this cross-bar we attach the pulley-cord, and fasten the pulley to an upright piece made fast to the foot of the bed in the ordinary manner.

6th. As an addition to this apparatus, I have a long screw, which, when used instead of other extension, is to be worked through the metal plate which connects the

bottoms of the splints, and to be connected with the sliding cross-bar to which the foot-piece and gaiter are attached. The object of this is to give the surgeon a choice between the weight and pulley and screw extension. When the weight and pulley are used, the screw is taken out, and when the screw is used, the weight and pulley are removed, together with the elastic attachments, and now the adhesive straps are fastened directly to the sliding cross-bar. In most cases, especially of adults, the weight and pulley extension is more reliable and effectual, and should be adopted. In many cases, after there is some union—the muscular tension having given away under the use of the weight and pulley and the elastic extension—the screw can be applied with moderate tension, and the weight dispensed with for the remainder of the time of treatment. The principal advantage of such a change at this stage of the treatment is, that by it the apparatus becomes moveable, and the patient is thereby allowed some change of position on the bed.

7th. Concerning the means of counter extension, it is hardly necessary for me to say to this Society, that when the weight extension is used, the best means of counter extension is secured by elevating the foot of the bed a little, say four inches, and thereby securing the counter extension by the natural weight of the body.

8th. Finally, your attention is called to the device which I have added to this apparatus, for the support of the upper part of the thigh, for securing the upper ends of the splints, and in case of screw extension, for use as a means of counter extension in place of the perineal band. I have a piece of sole leather cut and moulded to fit the thigh. It fits on the under or back side, and extends around the leg to a line even with the upper side of the splints. From this point forward, to cover the anterior surface of the thigh, softer and more flexible leather is used—two pieces of this softer leather being sewed to the

sole leather, and made to meet over the centre of the thigh in front, and here secured by lacing or by straps and buckles. The upper border of this socket is cut very obliquely, and made to fit the thigh at the gluteal fold—the greatest length being on the outside, which extends from the trochanter one-third the way to the knee. The sole leather is strengthened and kept in form by flexible steel strips riveted to the outside, and the inside of the socket is cushioned and lined with chamois skin. It fits the thigh in the same manner as the socket of an artificial limb fits the stump in cases of thigh amputation. This application of the thigh socket is the only part of the method to which I may claim any originality; and since making this, and treating a few cases with the splint thus improved, I have observed a similar device in use as a part of certain deformity braces for the support of the thigh in permanently ununited fractures of the femur. Kolbe, of Philadelphia, and Tieman & Co., of New York, advertise something like this for the above mentioned purpose in their illustrated catalogues. If such a socket for the thigh will support the weight of the body comfortably, thus allowing the patient to walk about with an ununited fracture, we may well conclude that, for the purpose here required, it will answer far better than what Dr. Van Buren has so justly called “that instrument of torture,”—the perineal band. A piece of light canvas or strong muslin passes under the limb, extending from the lower end of the thigh socket to the top of the gaiter, and, passing up on the inside of the splints, is tacked to the upper edge of the same. This supports the whole leg, and for the sake of comfort, a layer of cotton wadding may constitute a lining for this. The only bandage required is the roller that covers and supports the adhesive straps. Two bands should pass outside the long splint and around the body, one at the pelvis and the other at the top of the long splint around the chest. I have made a splice in the long splint at a point between the

trochanter and the crest of the ilium, that the upper part may be removed without disturbing the rest of the apparatus, when it is proper to allow the patient to sit up in bed. In applying this apparatus, it is of course important that care should be taken that its length and size is such as to fit the patient. The mattress should be comparatively soft, but firm and even, so that the body of the patient may not sink too deeply into it. The foot of the bed should be elevated as before stated, and the injured leg with the splint may rest upon what may be made by folding one or two sheets, or a light quilt, in such a manner as to form a long cushion two inches thick, extending from the nates to just above the heel, allowing the heel to drop over the end of the cushion and thereby be free from any bearing. The pulley support is now made fast in line at the proper distance, and the weight applied.

One word by way of remark. This is not a complicated contrivance, nor is its use impracticable because, in the sudden emergency of a case, it cannot readily be obtained. We will suppose a case of fracture of the femur in the country ten miles away from the physician's residence. He is called in haste soon after the occurrence of the accident, and on arriving at the place, discovers the nature of the injury. Now, in such a case, I claim that it would be bad and unjustifiable practice to hurriedly improvise an uncomfortable splint in a bungling manner for want of tools and material, and put up the leg for its six weeks or two months confinement, and suffer such to be the treatment, for the reason that it was the best at command. There is, in such a case, no occasion for haste in the application of the permanent apparatus. The surgeon may allow the leg to be placed in a comfortable position between large compresses made by rolling a folded quilt in the form of a double-headed roller, or between bags of bran, and go home and take the necessary time to make the suitable and efficient apparatus. There is nothing about the apparatus which I have now ex-

hibited to you that cannot be made by any man possessing the amount of mechanical ingenuity requisite to an ordinary success in surgery, providing he may command the services of a harness-maker and an ordinary gunsmith or machinist, or a skillful blacksmith. Painsstaking is the price of the highest success in any art, and most especially in that of ours.

HISTORY OF INVENTIONS AND IMPROVEMENTS.

While we have the mechanism of this apparatus in mind, I wish to notice, in brief, a review of the history and authorship of its different parts, and, in so doing, I think the appropriateness of the name "American method" will appear.

1st. The long outside splint, formerly called Desault's splint or Liston's splint, in the works of Gross and Hamilton is called Physick's splint, because of improvements made in it and its application by the late Dr. Physick, of Philadelphia. Dr. Physick also used an inside splint.*

2d. Dr. Wm. E. Horner, of Philadelphia, used the shorter inside splint, making the upper end of the same in the form of a crutch to help in counter extension by resting it against the perineum. He also cushioned the inside of both splints.†

3d. To Dr. Joseph Hartshorn, of Philadelphia, is accredited the cross-bar connecting the lower extremities of the splints, the extension screw, the upper cross-bar sliding in slots in the side splints, and the foot piece attached to the latter.‡

4th. The use of adhesive plaster as the means of connecting the extending power with the limb. There is some question as to the originality of this great improve-

* Gross' System of Surgery, 4th Ed., Vol. I, p. 954, and Hamilton's Fract. and Dis., 3d Ed., p. 402.

† Hamilton: Fract. and Dis., p. 416.

‡ Hamilton: Fract. and Dis., p. 416.

ment. Dr. Buck first employed it in the New York Hospital in 1852, and it constituted the principal claim to superiority of his apparatus first introduced abroad in 1865. But Dr. Buck gave the credit of it to Dr. Josiah Crosby, of New Hampshire. Dr. Van Buren says the latter was probably anticipated, without his knowledge, by Dr. Wallace, of Philadelphia, and that there is a tradition of its use in this way by more than a generation of country doctors in a remote corner of Pennsylvania.*

5th. The use of India rubber in the weight and pulley extension was made by Buck in his apparatus exhibited at the *Exhibition Universelle* of Paris, in 1867, and he has stated that he borrowed the idea from Dr. H. G. Davis, of New York, who used the elastic element in connection with weight and pulley extension in treatment of joint diseases.† Dr. Buck also made a perineal band of India rubber tubing of one inch caliber, and covered it with a cotton flannel bandage, wound on spirally, to be changed when soiled.

As to the advantages of the rubber in the extension, I desire to quote a paragraph from Dr. Van Buren's article in the *Medical Record* for March 30, 1878. He says: "I doubt whether we even yet properly estimate the advantages which India rubber offers in this direction to the surgeon. The gentle but unyielding force exerted by this curious substance when put upon the stretch or when subjected to compression, has no rival as an antagonist to muscular contractility; it follows up, without the slightest remission, the successively contracting and relaxing fasciculi which make the masses of muscular tissue, in such a manner as to exhaust their contractile capacity and to tire out the muscles in less time, and with less exertion of force, than with any other form of power.

6th. The weight and pulley extension. There is evi-

* *Med. Record*, N. Y., Mch. 30, 1878.

† *Med. Record*, N. Y., Mch. 30, 1878.

dence of an ancient use of this device, but the earliest definite account of the use of the weight for extension in this fracture, according to Dr. Hamilton, was made by Dr. L. C. Dugas, of Augusta, Georgia, who used a loop of bandage around the ankle for his attachment to the leg, and the rounded foot of the bed for his pulley. Dr. Buck substituted the pulley proper and the upright board to carry the rope.*

7th. The credit of elevating the foot of the bed, as a means of counter extension, is given to Dr. James L. Van Ingen, of Schenectady, New York.† This improvement is second to none in importance in all that goes to make up this method of treatment of fracture of the femur.

FRACTURE OF THE FEMUR IN CHILDREN.

This sketch is not intended as a complete chapter on the treatment of this fracture. Our works on surgery furnish ample minutiae to guide us in the practical application of any of the various methods of treatment. I will not, however, close this article without adding a few words concerning the treatment of fractured femur in children.

The peculiarities attending the cases of this fracture in children, *i. e.*, in persons under, say, twelve years of age, can be arranged in two classes: 1st, those which render the cases of children more difficult to treat than those of adults; and, 2d, such as render the chances for perfect results much more favorable.

First—The thigh of the child is proportionally larger and shorter than that of the adult, the muscles and other tissues are softer, and the vessels are more compressible. The skin of the child is easily irritated by the pressure either of appliances or bandages, and the latter are

* Med. Record, N. Y., Mch. 9, 1878.

† Trans. Am. Med. Ass. for 1857.

liable continually to be rendered much more irritating than they otherwise would be, by the excretions of the child; and lastly and principally, we have the want of intelligent submission to the necessary confinement of treatment that ordinarily may be secured in case of adults.

Second, and per contra—It is fortunately true that in children the fracture is apt to be more nearly transverse than is the case in adults. The fragments are bent at an angle oftener than thrown out of place; accordingly, the indications of treatment are different and somewhat reversed from what we find in adult cases. A quotation from a recent lecture of Dr. Hamilton is to the point here. He says: "For while, in adults, the first and most difficult indication is to overcome the shortening occasioned by the obliquity of the fracture and the powerful action of the fully developed muscles, and the second is to keep the limb in line—here, in the case of children, the first and most difficult indication is to keep the limb in line, and the second is to overcome the action of the muscles, or this indication may not be present at all." In matter of treatment, the same author discards the double inclined plane, the plaster of Paris bandage, the long splint, and the weight and pulley, as impracticable in case of children, and gives a method of his own, as follows: There are two long side splints extending from within two or three inches of each axilla—there being a splint on the outside of the well leg as well as on that of the fractured leg—to a distance of five inches below the bottoms of the feet. The lower ends of the splints are united by a cross-bar, the bar being long enough to cause the legs to be separated somewhat widely. These splints must be well padded, and the legs are secured to them by bandages. Then co-aptation splints, made of binders' board, or felt or sole leather, are applied to the injured thigh on front and on the inside, and a back splint, made of sole leather, stronger .

than the others, to the back side, extending from just below the tuber ischii to three or four inches below the knee. On this back splint the limb is to rest, and it must be carefully fitted and padded. These co-aptation splints are to be secured by bandages, and the bandages must be sewed to the covering of the splints, so that the latter may not slip under the bandages. Pass bands around the body and splints over the pelvis and over the chest at the upper ends of the splints, and the apparatus is complete. This device, in the hands of a surgeon of sufficient practical skill to be able to fit it properly to the child, to make the co-aptation splints of such material and length and thickness, and, in applying, so to protect them from the excretions of the child as to make the child comfortable, is effectually about what a well fitted and well cushioned wire *cuirass* would be for the whole body and limbs of the child, as now used in the treatment of hip-joint disease. The cuirass might be a more complete and perfect appliance, but it cannot be improvised by the surgeon or readily enough obtained, except in the large city, for the emergency of a fracture, while the apparatus of Hamilton can be made by anyone.

CONCERNING PROGNOSIS.

What is a reasonable prognosis in the majority of cases of simple fracture of the shaft of the femur in adults? Can we ordinarily hope for recovery without shortening? The almost universal answer of the profession is that we cannot, even with the best treatment; and I think that general experience proves that the result in this regard is apt to be much more unfavorable when dependence is placed upon side supports alone, the plaster of Paris dressing and the like, than it is when main reliance is put upon a direct and continuous extending force.

Dr. Hodgen, of St. Louis, in his excellent paper to the American Medical Association, at Chicago, in 1877, says: "Let us for a moment consider the changes occurring in

a fractured limb during the use of the long splint of Liston. Place the splint on the outer aspect of the limb, let it extend below the foot and above the hip, bind the limb and the splint with the usual roller bandage, extend the muscles by such force as may be required to give the limb its proper length, and allow the fragments to occupy their proper relations; now draw tight your well padded perineal band, and fix it so that it cannot loosen. You visit your patient on the second day to examine the dressings, and find the perineal band is not tight, measure the limb, and you find it shortened. Again extend the muscles, once more tighten the perineal band, and repeat this process every day or two for four, six, eight, or twelve weeks, and at the end of this time it will be found that the perineal band has elongated, the tissues about the perineum, the prominence of the rounded thigh, the fullness of the outer part of the leg, the plumpness of the instep have atrophied, and through these changes, both in the extending apparatus and the tissues, the muscles have, by their tonic contractile power, shortened the limb.

"Follow another case: Put your patient on a firm table, place a padded iron standard between his thighs, attach a screw-extending apparatus to the lower part of his leg, etherize the patient and stretch the muscles until the ends of the fragments come fully into position, pad the projecting bony points with cotton wool, apply a wet bandage impregnated with plaster of Paris, in layers sufficiently numerous to form a firm plaster case which accurately fits the limb and extends to the tuberosity of the ischium and the spine of the ilium. Continue the anæsthetic and the extension until the plaster is firmly set. Now, do not fancy because you have made the adjustment perfect, and applied the plaster smoothly, that this plaster will continue to fit perfectly. Atrophy will occur rapidly and unequally, the muscular tissue will constantly tend to produce the shortening which the atrophy of the points of

pressure of the extending and counter-extending forces will permit. After a week you will find you can put your finger between the foot and the plaster case, while you may place your hand between the plaster and the hip. If you percuss the front of the plaster case, it will yield a resonant sound. It will be found that the limb is too small for the apparatus of fixation, and, indeed, the limb is not fixed, but badly requires fixing. What now? Cut the case in front from end to end, take out a piece or put in padding, and once more adjust the fixed apparatus to the unstable limb. What can be more unstable than the ever wasting, ever changing tissue of the human body?"

Finally, on the question of unavoidable shortening, the following resolution was passed in the Section on Surgery and Anatomy of the American Medical Association at the Chicago meeting:

"Resolved, That it is the opinion of this Section, that shortening, in cases of fracture of long bones, is the rule in practice, regardless of any of the plans of treatment now in use."

This was passed as the decided expression of the entire Section, which at that hour comprised the great majority of all the members of the Convention. It is safe to say that the opinion expressed by this resolution is held by the great body of surgeons everywhere, and that this opinion is based upon the known results of the best surgical work done in all countries to the present time. This being the case, we may well conclude that the individual protest against the doctrine of this resolution made by Dr. L. A. Sayre, of New York, at the meeting of the American Medical Association recently held in Buffalo, will have very little effect upon the general professional opinion in this matter. To fully realize where and to what extent that individual protest of Dr. Sayre was appreciated, one should read the report and editorial notice of the same published in the Chicago Times a day or two

after it was made in the Buffalo meeting. The medical profession of the West have a reason for their opinion concerning the character and value of the protest, if it is known to have the endorsement of the Chicago Times.

On this question of necessary shortening I cannot forbear introducing one more quotation from Hamilton. It is concerning the pretense of Desault (according to Malgaigne), of Dorsey, of Philadelphia, and of Dr. Scott, of Montreal,—and, if writing now, he might include Dr. Sayre, of New York,—that they could treat fractures of the femur without any shortening as a rule. Dr. Hamilton treats the question of the veracity of these gentlemen very handsomely as follows:*

“It is never a pleasant duty to call in question the accuracy of an author’s statement as to what he has himself alone seen and experienced. The circumstances which would justify such an expression of scepticism, when the witnesses, as in this case, are presumed to be intelligent and honest men, must be extraordinary. Such, however, I conceive to be the circumstances in this instance. It is certainly very extraordinary that a few gentlemen of acknowledged ability, but whose means and appliances are concealed from no one, are able to do what nearly the whole world besides, with the same means, acknowledges itself unable to accomplish. Such is the fact nevertheless, and our lack of faith in their testimony is only a necessary result of our experience, and of the experience of the vast majority of practical surgeons as opposed to theirs.”

It is enough to read the evidence adduced from the experience and in the writings of such men as Chelius, John Bell, Velpeau, Nelaton, Malgaigne, and, in this country, of Dr. Jonathan Knight, Dr. Detmold, J. Mason Warren, Gordon Buch, Dr. Lente, Frank Hamilton, John T. Hodgen, and many others of wide experience,

*Treatise on Fract. and Dis., p. 402.

many of whom have availed themselves of the advantages of all modern appliances, to convince us that an entire freedom from shortening, especially in cases of adults, is not to be expected under any treatment. The great practical question then is, how to reduce the shortening and deformity to the least amount possible in all cases.

NOTES OF CASES.

Within a few weeks three cases of fracture of the shaft of the femur in adults have come under my observation—two in my own practice, and one in that of Dr. J. B. McGaughey, of Winona. These cases have been treated by the general method described in this paper.

CASE NO. 1.

A strong Norwegian had fracture of the femur at about the middle, caused by the direct violence of a heavy blow from a strong piece of timber. Abscess occurred beneath the point of external injury, but the lesion did not communicate with the bone. This case was treated by the screw extension, and recovery was perfect with a shortening of about three-fourths of an inch.

CASE NO. 2.

This case was that of a young man, American, rather slender, a merchant. He received a fracture of the femur, very oblique, at the union of the middle with the lower third, while playing with a foot-ball. He received an accidental blow from the foot of another person and fell to the ground, when it was discovered that his thigh was broken as above. The case was treated exclusively with the weight and pulley extension, with the foot of the bed elevated. Union was slow, and recovery took place with

nearly inch shortening. This case was treated under favorable circumstances, as regards the surroundings, but I think not altogether favorable as regards the vital condition of the patient, as perhaps was shown in the condition of the bone, giving away as it did from so slight a cause of fracture. The case had skillful and faithful surgical care.

[NOTE.—An examination of both legs of this patient, after union of the fracture had taken place, disclosed the fact that the tibia of the uninjured leg was, at least, one-half inch longer than the other, and it was evident that there had been this difference in the actual length of the legs before the fracture. The attention of the profession has been recently called to the fact that a want of symmetry in legs frequently exists. A short time since a suit for mal-practice was brought in Perry County, Pa., because of a shortened femur, after treatment, of five-eighths of an inch. Drs. Agnew and Hunt, of Philadelphia, testified that they had measured many limbs, and had found them unequal without previous fracture; the brother of the plaintiff, whom they chanced to measure, had a normal difference of three-eighths of an inch. The case was non-suited without delay.—*Medical and Surgical Reporter, Philadelphia, for July 6, 1878, p. 18.*]

CASE No. 3

Was that of a Swede, middle aged, of rather intemperate habits, who was caught, while at work in the woods, by a falling tree, and the thigh was broken by being bent under his body as he was prostrated by the weight of the tree. He was treated on rather a hard bed in a small room in a Scandinavian hotel, with the weight and pulley extension. The foot of the bed was elevated four inches. The apparatus, made exactly as the one here exhibited, was applied, and a heavy rail-car link used as the weight.

The weight was kept on a little more than three weeks, and the splint allowed to remain about two weeks after the weight was removed, and then a silicate of soda dressing used to allow him to get up. He seemed to enjoy life all the time of his confinement, and recovery took place with less than one-half inch shortening.

The results obtained in the three cases I think represent about the average of what may be expected in similar cases with good treatment under favorable circumstances.

